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Optimization of an Interactive Distributive Computer Network

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Optimization of an Interactive Distributive Computer Network
Final Report

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Prepared for
Ames Research Center
under Contract NCC2-31

July 1985



National Aeronautics and
Space Administration

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NASA-AMES COOPERATIVE AGREEMENT
NO. NCC 2-31

"OPTIMIZATION OF AN INTERACTIVE DISTRIBUTIVE COMPUTER NETWORK"

FINAL REPORT, COVERING THE PERIOD
OCTOBER, 1979 TO DECEMBER, 1984

VIVIAN FREDERICK, PRINCIPAL INVESTIGATOR

THE NASA TECHNICAL OFFICER FOR THIS AGREEMENT IS
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1.0 INTRODUCTION

Cooperative Agreement No. NCC 2-31 between Foothill-De Anza Community College District and NASA Ames Research was initiated in October 1979 and continued on a year-to-year basis through December 1984. In December 1984 it was proposed that the title of Agreement NCC 2-31 be changed to more accurately reflect the current activities. Because of the title change, a new agreement number was assigned and the old Agreement was closed out. This report covers the activities of the Principal Investigator and other participants under Agreement No. NCC 2-31 from October 1979 through December 1984.

2.0 AREAS OF INVESTIGATION

Research supported by Cooperative Agreement NCC 2-31 (hereafter referred to as The Agreement) has been mainly concentrated in 3 major areas:

- A. Computer Operating Systems Optimization and Integration;
- B. Participation in the software development and implementation of the IRIS (Infrared Imaging of Shuttle) project;
- C. Participation in the design, development and implementation of the APS (Aerosol Particle System) project.

Each of these items is discussed more fully in the following sections of this document.

2.1 COMPUTER OPERATING SYSTEMS OPTIMIZATION AND INTEGRATION

In 1979 computing facilities of the Project Technology Branch consisted of a Digital Equipment Corporation (DEC) PDP11/70 computer linked to Central Facilities' CDC-7600 via the Cyber 11 system and to the IBM 360/70 via the Data Switch. One of the objectives of The Agreement was to achieve maximum utilization of equipment by multiple users and to investigate and recommend equipment changes and upgrades that would facilitate the processing and analysis of research data.

In December 1984, when The Agreement was terminated, 48 users were being supported by computing facilities consisting of a PDP11/70 running the RSX11M+ operating system, and a VAX 11/780 running both DEC's VMS and the Eunice operating systems. Eunice is a UNIX look-alike system that is compatible with VMS. All users had access to Decnet and Arpanet. Additional special-use computing facilities included a Symbolics 3600 and a Symbolics 3640, connected to the VAX via Ethernet, a DEC Word Processing System with 6 stations, an IBM PC connected to the Micom Switch, and a stand-alone APPLE Lisa System.

Personnel supported by The Agreement have been directly responsible for the selection, installation, integration, optimization, and day-to-day operation and maintenance of this computing equipment and its supporting software.

Documentation produced to assist users of othe computing equipment include "FPT File Structure", "Users Guide, SPT Data Analysis & Simulation Facility", and participation in "Space Projects Division Software Development Requirements and Programming Guide".

At frequent and regular intervals during the period of this agreement, NCC 2-31 personnel presented classes or presided at meetings designed to aid and assist users of the SPT computing equipment.

2.2 IRIS SOFTWARE DEVELOPMENT

DURING 1981 AND 1982 A MAJOR ACTIVITY SUPPORTED BY THE AGREEMENT WAS DEFINING THE ALGORITHM, AND DESIGNING, DEVELOPING, AND IMPLEMENTING THE SYSTEM SOFTWARE FOR THE INFRARED IMAGERY OF SHUTTLE (IRIS) EXPERIMENT. THE RESPONSIBILITIES ALSO INCLUDED THE DEFINITION OF TEST CASES AND DIAGNOSTICS TO EVALUATE THE SOFTWARE, AS WELL AS PARTICIPATION AS THE FLIGHT TEAM SOFTWARE ENGINEER ON THE IRIS FLIGHT. THE IRIS EXPERIMENT WAS SUCCESSFULLY TESTED IN 1982 DURING THE RE-ENTRY OF STS-3.

DOCUMENTATION FOR THIS ACTIVITY IS INCLUDED IN "INFRARED IMAGERY OF SHUTTLE (IRIS) EXPERIMENT, IRIS/STS-3 ENGINEERING REPORT, JUNE 23, 1982".

2.3 APS SOFTWARE DEVELOPMENT

THE AEROSOL PARTICLE STUDY (APS) PROJECT WAS INITIATED IN 1983 AND CONTINUED THROUGH 1984. APS IS A RESEARCH PROJECT DEVOTED TO AUTOMATING THE PROCESS OF MEASURING THE SULFURIC ACID CONTENT IN THE ATMOSPHERE. AEROSOL PARTICLES ARE COLLECTED ON A SAMPLING DEVICE MOUNTED BENEATH THE WING OF A NASA RESEARCH AIRCRAFT; THE SAMPLING DEVICE IS PHOTOGRAPHED THROUGH AN ELECTRON MICROSCOPE AND THE PHOTOGRAPHS ARE ANALYZED TO DETERMINE THE SIZE AND DISTRIBUTION OF THE AEROSOL PARTICLES OBSERVED. ONE OF THE OBJECTIVES OF THE AGREEMENT WAS TO DESIGN, DEVELOP, AND IMPLEMENT THE SOFTWARE REQUIRED TO MAKE THE ANALYSIS. PRIOR TO APS THE ANALYSIS HAD BEEN DONE BY HUMANS INSPECTING THE PHOTOGRAPHS. THE ANALYSIS SOFTWARE BEING DEVELOPED UNDER THIS AGREEMENT WAS NOT COMPLETE AS OF DECEMBER 1984, BUT IT APPEARS PROMISING THAT IT WILL BE COMPLETED AND SUCCESSFULLY DEPLOYED DURING 1985.

3.0 PERSONNEL

IN ADDITION TO THE PRINCIPAL INVESTIGATOR, KEY PERSONNEL ASSIGNED TO THE ABOVE PROJECTS WERE SYSTEM ANALYSTS B. J. BARGADDA AND LIBBY NETLAND.

4.0 PUBLICATIONS

INTERNAL DOCUMENTS RESULTING FROM THIS AGREEMENT WERE

1. FPT FILE STRUCTURE
2. USERS GUIDE, SPT DATA ANALYSIS & SIMULATION FACILITY
3. SPACE PROJECTS DIVISION SOFTWARE DEVELOPMENT REQUIREMENTS AND PROGRAMMING GUIDE
4. INFRARED IMAGERY OF SHUTTLE (IRIS) EXPERIMENT
IRIS/STS-3 ENGINEERING REPORT, JUNE 23, 1982

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16. Abstract A short report covering activities under a cooperative agreement between NASA and Foothill-De Anza Community College District over a five year period. Research activities covered are: Computer Operating Systems Optimization and Integration; Software Development and Implementation of the IRIS (Infrared Imaging of Shuttle) Experiment; Software Design, Development, and Implementation of the APS (Aerosol Particle System) Experiment.					
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